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Basic English and Technology

It is obvious that the application of basic English will be difficult as applied to matters technological, for with the learning of a profession or craft, the student is gradually introduced to a fresh vocabulary. For the professions, many of the scientific terms are virtually international in application—at least they were until Nazi arrogance tried to Germanise all words of Latin or Greek origin. With the crafts, however, it is quite different, and translation from one language to another becomes increasingly difficult. Whilst there are many excellent technical dictionaries, there are but few idioticons, that is, manuals, which give explanations of words or phrases peculiar to one part of a country. Yet such works would seem necessary, as the technical terms associated with the crafts vary from one district to another.

Because of this it is not always easy to give the exact English of the various French words for scrap, which can be *mitraille, ferrail, scraps, bocages,* etc. Conversely, it would be equally difficult to write in French exactly what an author means when he uses such variants of the word "slag" as dross, dirt, scruff, scum, to mention but a few. Obviously, not only are some of these terms redundant, but their local interpretation may be different. "*Bocages,*" for instance, can vary in one district from heavy hematite scrap to remelted miscellaneous metal to yield a homogeneous material in another! Then quite often there are two spellings giving the same significance which can worry the layman, such as, for instance, clamp and cramp; bod and bott; launder and lander. There was, as a result of co-operation in pre-war days, much interest in the nomenclature of foundry practice, and a few enthusiasts made some progress towards the compilation of an international technical dictionary. At the outset it was realised that, if only the nationalities would define by phrase or sketch all the technical words entering into foundry practice, the actual compilation of a dictionary would be easy. It was not long before the French asked for a definition of the word "sound" in the foundry sense, and it was difficult to formulate a universally accepted definition. Thus the word is placed in a category which suggests its discontinuance in documents designed for foreign consumption, and phrases such as "free from internal defects" or "free from all types of defects" should be used. This is necessary because, from the engineer's point of view, a cylinder free from internal defects is unsound if it carries a scab which he doubts will machine out. If technical Papers are to be subject to reduction to basic English, then there is a need for much simplification, unification of spelling and the elimination of purely localisms.

As to the translation of trade literature, such as catalogues, price-lists, and the like, we suggest simply that this should not be done. The sole method is to familiarise a national of the country to be circularised with what is for sale and leave it to him to explain to an advertising consultant of that country what is necessary, unless an experienced overseas agent undertakes the task on similar lines. If this cannot be done, it will be better to print such matter in basic English, using as few technical terms as possible. People who have had experience of basic English tell us that the resulting documents are better in that there are fewer ambiguities and less likelihood of final interpretation by high court judges.

We do not for a moment imagine that many scientific and technical Papers will be reduced to basic English, but we are reasonably certain that it will have its effects, because so many people will be devoting so much time to its study and application. These effects will all be in the direction of simplification of expression, especially when written for international gatherings. Maybe the first translation to be made will be from standard English to basic!

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NEW METHODS OF TEMPERATURE MEASUREMENT

In a Paper, "Barrier-Layer Photo-Electric Cells for Temperature Measurement," which MR. T. LAND, of the Research Department of William Jessop & Sons, Limited, has prepared for presentation to the Iron and Steel Institute, the author has summarised his work in the following terms.

The selenium barrier-layer photo-electric cell offers many advantages for the measurement of temperatures in the foundry. Such cells have previously been used for temperature measurement, but little has been known about their limitations or their calibration. Ten cells were investigated and their fatigue, their temperature coefficients and their departure from linear response were determined. The calibration of each cell was established, using a black-body furnace and a tungsten-ribbon-filament lamp as sources of radiation. The theoretical investigation shows the relation of the calibration to the spectral sensitivity and the correction which must be applied when a tungsten lamp is used as a temperature standard. It was established that if allowance was made for the small differences in sensitivity between individual cells (about $\pm$ 4 per cent.), a single table adequately represented the calibration of the cells. Nine of the ten cells proved satisfactory for temperature measurement. The design of the optical system and its effect on the calibration of the pyrometer were studied theoretically and experimentally, and a basis for the design and calibration of pyrometers was laid down.

A second Paper of this group, "The Emissivity Characteristics of Hot Metals, with Special Reference to the Infra-Red," by MR. D. J. PRICE, B.Sc., and DR. H. LOWERY, of the South-West Essex Technical College, Walthamstow, London, is prefaced by the following statement.

Study of Emissivity

The theoretical and practical considerations in connection with the study of emissivity are discussed and the relevant literature is critically surveyed. The application of emissivity data to the correction of pyrometer readings has been examined and the necessity of an adequate knowledge of emissivity data is indicated. The information at present available does not meet this need, especially in the important case of iron, and, in view of this, suggestions for future experimental researches are noted.

Correlation of all available data appears to indicate a zero temperature coefficient of emissivity (for all substances) at a specific wave-length in the infra-red region. This implies that at a certain wave-length peculiar to each substance the emissivity correction to a pyrometer would take a much simpler form than at present.

These two Papers have been submitted by the Foundry Steel Temperatures Sub-Committee. A third one, dealing with the practical ascertainment of metal temperatures when bottom pouring, has been prepared by Mr. D. A. Oliver, and this will be printed quite fully in a future issue. Still on this subject, there is a Paper from the Liquid Steel Temperature Sub-Committee of the Committee on the Heterogeneity of Steel Ingots. Carrying the title "The Drift of Selenium Photo-Electric Cells in Relation to Their Use in Temperature Measurement," it has been written by MR. J. A. HALL, A.R.C.S., of the Physics Department of the National Physical Laboratory, Teddington, and is summarised as follows:—

The Paper describes experiments made to investigate the "drift" effect in selenium barrier-layer photo-electric cells intended to be used for temperature measurement. It was found that the drift of seven of the nine cells examined was too great to permit of their use for the most accurate work. However, a comparison with work done by Land showed that his cells were, on the average, more satisfactory and that, by pooling the two batches, eleven satisfactory cells could be obtained from a total of 19.

The following characteristics of the drift effect were noted. The drift, expressed as a percentage, is independent of the current given by the cell, and hence of the brightness to which the cell is exposed. If a cell is allowed to drift by exposure to radiation from a source at a given temperature and the temperature is then increased, the initial response to the higher temperature is almost, but not quite, as great as if the cell had not previously drifted at the lower temperature. Drift is much reduced when deep-red and infra-red radiation is excluded. Among the filters examined, a $\frac{1}{4}$-in. thickness of Calorex glass was sufficient to obtain the maximum observed reduction in drift (about 50 per cent.). No drift was observed when the cell was exposed on open circuit. If the illumination of a cell is interrupted for a short period and then resumed, the sensitivity of the cell recovers somewhat during the "rest" period, but rapidly resumes the value it had had just before, irrespective of whether it had previously been allowed to drift for a long or a short period. The speed of recovery depended to some extent on the circuit conditions under which the cell was allowed to recover, and was most rapid when the cell was short-circuited.

PROPOSED MEMORIAL TO THE LATE DR. W. H. HATFIELD, F.R.S.

An appeal signed by the Vice-Chancellor of Sheffield University, the President of the Royal Society and the President of the Iron and Steel Institute, has for its object the raising of £5,000 for the purpose of commemorating the "great services to metallurgical science and his outstanding achievement in promoting co-operative research within the Iron and Steel Industry" of the late Dr. W. H. Hatfield, F.R.S. This, it is proposed, will take the form of an Annual Lecture to be given by scientists of the highest distinction irrespective of nationality. No doubt many foundry concerns and individuals connected with this industry will wish to contribute, and cheques, crossed the "Hatfield Memorial Lecture Fund," should be sent to Mr. K. Headlam-Morley, the Iron and Steel Institute, 4, Grosvenor Gardens, London, S.W.1.

STANDARD COSTING AND COST CONTROL

By A. N. WORMLEIGHTON

Standard costs answer fully the main basic purposes of costing

INTRODUCTION

The system used by the Phosphor Bronze Company, Limited, is "standard costing." It aims at finding what the cost should be, and not what the actual cost of any given article is. It determines the cost before the commencement of operations, and not after they have been finished. Many expert cost accountants and business efficiency experts have written a great number of books on the subject, and no claim is made that the system described is in any way unique, but it is claimed that the methods adopted are reasonably simple in their application, and can be extended to any type of business in such a manner as will make for easy installation stage by stage, and will give the full benefits that should be reaped from the system of cost control.

* A Paper read before the Lancashire Branch of the Institute of British Foundrymen.

Philip Carroll, jun., in his book, "Time Study for Cost Control," expresses the idea of standards in the following words:—"Standardisation has occupied the attention of many people during the past decade. Buildings are erected in strict accordance with a code, and the boiler used for generating steam must meet certain specifications. Raw materials are purchased to definite specifications within commercial tolerances by manufacturers who must have other than run-of-the-mine materials. Most of the commonly used materials have been codified by trade associations and engineering societies, so that to-day, for example, S.A.E. 1020 is understood to mean a very definite kind of steel having certain chemical and physical properties.

"Supplementing specifications are agencies for determining whether or not products delivered do conform to the standards. The quantities that go into

FOUNDRY COST ESTIMATE

CUSTOMER		PART NO.	
		PRINT NO.	
PATT. NO.	NO. ON PLATE	ROUGH WEIGHT	
DESCRIPTION	CORES PER BOX	WEIGHT OF HEADS, ETC.	
ALLOY:		COST PER PIECE	SPECIAL NOTES
NO. OF CASTINGS PER BOX	YIELD	MOULDING	
TIME PER BOX	CLASS	TRIMMING	
TIME PER EACH	GROUP	CUT CUTTING	
		CORE MAKING	
		CLOSING	

FIG. 1.

FOUNDRY COST ESTIMATE

CUSTOMER	JOHN BROWN & SONS LTD.	PART NO	F999 3/2/43.
		PRINT NO	
PATT. NO.	"A" NO. ON PLATE	ROUGH WEIGHT	10½ LBS.
DESCRIPTION	Sleeve 28" x 6" CORES PER BOX	WEIGHT OF HEADS, ETC.	1½ LBS.
ALLOY:	BSS. 421	COST PER PIECE	SPECIAL NOTES
NO. OF CASTINGS PER BOX	4	MOULDING 10	
TIME PER BOX	40	TRIMMING 4	
TIME PER EACH	10	CUT CUTTING 1½	(BAND SAW)
		CORE MAKING	
		CLOSING	

MOULD ON END 1 PER BOX
WORK:- 6'10"x6" TOP PART
6'10"x9" CUT ...

FIG. 2.

OPERATIVE No.	CLASS	DATE	SP. SCR.	SHP. SCR.	GOOD

MOULDING

CUSTOMER	DATE OF ORDER	ORDER No.
JOHN SPRAGG LTD.	16.12.42	1234

QUANT.	DESCRIPTION	PRINT & PATT. No.
100	SPINDLE BRASSES. NO. VII (SEVEN)	890

OPERATION	MINS. ALL'D EA.	PATTERN No. CHECK
MOULD	20. MINS	890

PROGRESS

BATCH No.

FIG. 3.

OPERATIVE No.	CLASS	DATE	SP. SCR.	SHP. SCR.	GOOD

MOULDING

CUSTOMER	DATE OF ORDER	ORDER No.
JOHN SPRAGG LTD.	16.12.42	1234

QUANT.	DESCRIPTION	PRINT & PATT. No.
100	SPINDLE BRASSES. NO. VII (SEVEN)	890

OPERATION	MINS. ALL'D EA.	PATTERN No. CHECK
MOULD	20. MINS	890

No. TO PAY	TIME ALL'D.	TIME TAKEN	EXTENSION	BONUS	EXTENSIONS

RATE

WAGES DOCKET

BATCH No.

FIG. 4.

Standard Costing and Cost Control

private homes are supervised by the Bureau of Weights and Measures, while the quality is inspected by men acting under the Pure Food Laws. The manufacturer analyses and tests material received to see that it meets some form of specification. He is aided by the Bureau of Standards, which is equipped to measure quantity and quality to an exceedingly high degree of accuracy. But in the vivid description of the reckoning facilities of the Bureau that appeared in a recent periodical, no mention whatever was made of a means of measuring labour.

"The manufacturer is a large purchaser of labour, but he must supply the specifications of quality and quantity or go without them. He may attempt to do this himself or may call upon some specialist in the field of measurement. Time study will undoubtedly be used to obtain the data, because it is the most practical method thus far developed for measuring effort."

Charter Harrison, in his book, "Cost Accounting to Aid Production," writes:—"The forward march of civilisation has only been rendered possible by the adoption of standards. Standards passed on from father to son, and from generation to generation represent the ratchets on the wheels of progress, and have enabled each forward step, painfully and slowly made, to be maintained."

Many foundrymen have, during vacations—or at other times—come across an unfinished mansion, locally known as "Smith's Folly," and why? Someone has set out to build the mansion without first ascertaining that their purse could meet the cost, and it earns the contempt of all who see it—yet industry has been content, until the idea of "standard costs" was evolved by Charter Harrison, to count the cost after the job was done.

Predetermination, or a setting of performance standards, is now recognised as being possible at all stages of production. When these performance standards are converted into terms of money, they become "standard costs." Kearsey, in his book, "Standard Costs," says:—

"Simply expressed, standard costing is a method of ascertaining how much the cost should be, and analysing the causes of the variation between how much they are and how much they should be. That statement being true, it therefore follows that standard costs answer fully the main basic purposes of costing:—(1) To provide the sales organisation with price-fixing

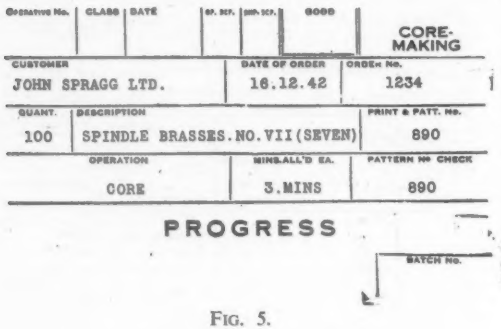

FIG. 5.

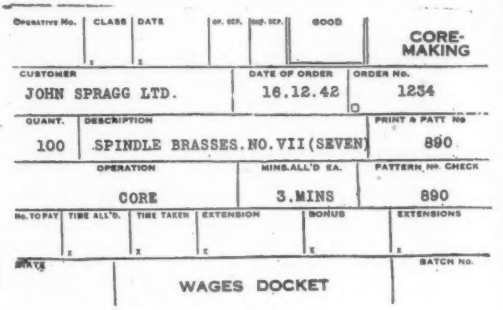

FIG. 6.

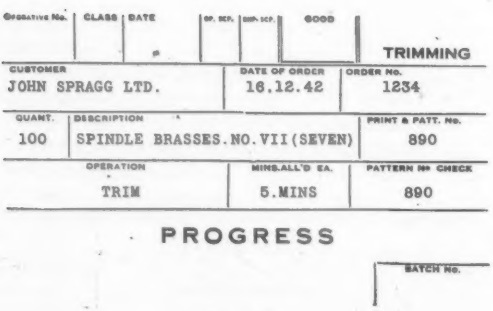

FIG. 7.

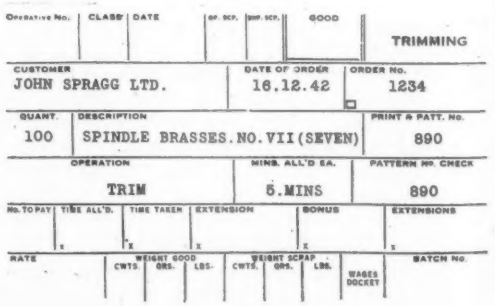

FIG. 8.

figures; (2) to provide analytical control over the whole activities of business; and (3) to give a clear picture of efficiency in terms of cost."

Estimate Card

It will be seen that the whole structure depends upon scientific predetermination of the factors which are the build-up of any given job. Referring to Fig. 1, the Foundry Cost Estimate Card, this card has recorded on it all the essential data which are required for producing the particular job. "Customer," "Pattern Number," and "Description" need no explanation, as they mainly serve the purpose of identifying a particular job. The same remarks apply to the Part Number. The rough weight is the weight of the finished casting, and the word "rough" is only used because on the reverse side of the card there is the study for machining purposes, but, at the moment, consideration of this is being given only from the foundry point of view, and it was thought advisable to explain why the word "rough" appears there at all, as it might be misleading to some. The weight of the casting can be obtained by many methods: by calculation from drawings; in some cases by weighing of the pattern, and multiplying by the appropriate weight factor for such type of pattern. As Mr. Davies expresses it in his survey:—"Continuous experience renders it possible for the estimator to get very close to the finished weight of the casting from the drawing." Indeed, for the smaller jobs the Time Study Engineer can give the weight on sight of either pattern or drawing, which weight will be accurate enough for the purposes for which it is required.

The next item on the Foundry Cost Estimate Card to consider is the Weight of Heads, etc. Obviously, in making a study of any particular job, the time study engineer must decide the size of the box which is to be used, and also the method of gating, and, having determined these factors, and being in possession of the pattern or drawing, he can make a very accurate predetermination of the amount of heads, runners and risers required. From the weight of the casting and the weight of the heads, etc., can be calculated the yield. By the yield is meant the number of pounds of castings which are obtained from 100 lbs. of metal sent to melt. The percentage which the heads, runners and risers represent of the total weight of castings, plus heads, is suitably adjusted to allow for melting losses, and other process losses which take place

MOULDING CONTROL CARD

CUSTOMER		DATE OF ORDER	ORDER No.
JOHN SPRAGG LTD.		16.12.42	1234
QUANT.	DESCRIPTION		PRINT & PATT. No.
100	SPINDLE BRASSES. NO. VII (SEVEN)		890
CUSTOMER CHECK			PRINT & PATT. No. CHECK
JOHN SPRAGG LTD.			SPINDLE BRASSES 890

No. ON PLATE	CASTINGS PER BOX	CORES PER BOX		No. OF CORE BOXES	CORE BOX NO'S.
..	4	4			

CLASS	ALLOY	ROUGH WEIGHT CWTS QRS LBS	TIME PER BOX	TIME EACH	YIELD
G.S. C3/C	VII (SEVEN)	1 - 0 - 0	80.M	20.M	80%

TICKETS ISSUED

DATCH	DATE	OPERATIVE NO.	OP. DEP.	DEP. DEP.	NO. GOOD	TOTAL	DATCH	DATE	OPERATIVE NO.	OP. DEP.	DEP. DEP.	NO. GOOD	TOTAL

FIG. 9.

SCRAP OR RE-ISSUE.

CUSTOMER		DATE OF ORDER	ORDER No.
QUANT.	DESCRIPTION		PRINT & PATT. No.
CHARGE A/c. No.		SCRAP SEEN BY	

CLASS	ALLOY	MOULDER'S FAULT	REASON FOR SCRAP

FIG. 10.

MOULDING TIME EACH _____

CORE: TIME EACH _____

TRIM: TIME EACH _____

PATTERN LABEL

CUSTOMER		DATE OF ORDER	ORDER No
JOHN SPRAGG LTD.		16.12.42	1234
QUANT.	DESCRIPTION		PRINT & PATT. No.
100	SPINDLE BRASSES. NO. VII (SEVEN)		890
CUSTOMER CHECK			PRINT & PATT. No CHECK
JOHN SPRAGG LTD.			SPINDLE BRASSES 890

No. ON PLATE	CASTINGS PER BOX	CORES PER BOX		No. OF CORE BOXES	CORE BOX NO'S.
..	4	4			

CLASS	ALLOY	ROUGH WEIGHT CWTS QRS LBS	TIME PER BOX	TIME EACH	YIELD
G.S. C3/C	VII (SEVEN)	1 - 0 - 0	80.M	20.M	80%

FIG. 11.

Standard Costing and Cost Control

during production. The Class and Group are indicated by codes (which would, of course, be peculiar to each business and are the means of routing the pattern to the correct moulding point). The codes used by the Author's company are as follow:—(*a*) Is intricate; (*b*) is moderate; (*c*) is plain; a figure (1) represents floor moulding; a figure (2) represents strickle moulding; a figure (3) represents bench moulding; and a figure (4) represents machine moulding.

The group is used to indicate either dry- or green-sand moulding. It will be seen that by a combination of letters and figures along these lines the pattern can be directed in accordance with the time study to its appropriate work point by means of a simple single

MATERIAL REQUISITION.

FOUNDRY	Date	Foreman's Sig
Quantity	Description of Material	For what required

Description of Material Used.
(To be filled in on duplicate and triplicate copies only)

Storeman's Signature

For Office Use

	£	s.	d.

No. 13

FIG. 12.

routing, as in the case of the castings illustrated by Fig. 2, routings reading B.3.C.D.S. The other information which is required on the predetermined study for standard cost processes is the performance times.

Conversion to Money Standards

The above yields the standard performance data. It is not possible, however, to accept these data, and to say that by converting them into money they give the standard cost. Ways and means must be evolved to ensure that the performances laid down in the time study shall be kept. For this purpose the Phosphor Bronze Company use the Ormig Simplex method of routing, the object of which is to ensure that the quantity called for by the customer's order is the quantity which is made and paid for at the piecework figure set by the time study engineer, and that the routing laid down shall be followed. A series of pre-printed tickets giving the information obtained from the Foundry Cost Estimate Card is issued. These are shown in Figs. 3 to 9. The tickets themselves show which operation they cover, and contain the pre-set time factor, and the quantity called for on the order. The tickets are marked respectively "Wages Docket" and "Progress Docket." The Wages Docket, as its name implies, goes straight to the wages payment section when the necessary information has been recorded upon it by the shop clerk. The Progress Docket is filed under its order number until such time as the job is completed and despatched, by which time the control card has also been returned for filing (Fig. 9).

Scrap Casting Costs

The control card for each operation is a pre-printed card ruled on its reverse side, so that each batch may be recorded upon it by the shop clerk. Therefore, the progress dockets should agree with the control card. Any other booking will be at once revealed

INSPECTION DEPT.

TRANSFER NOTE

DATE	Cwts	Qrs.	Lbs.

No. 34 RECEIVED BY

FIG. 13.

when the numbers produced are added for agreement with the quantity ordered of any given job. Since the operator's number is known, the amount so overpaid, if any, can be recovered. It equally applies that any under-payment can be made good. From early statements it would appear, at first examination, that the author had estimated no scrap would ever be made. This, of course, is impossible, and scrap must be provided for. Scrap castings, when discovered by inspection, obviously need further manufacture to replace them to make up the quantity called for upon the customer's order. A scrap replacement docket is issued (see Fig. 10), showing to which department the fault is chargeable, and if it is due to operator or other reasons. This scrap replacement is an expense which is incurred over and above the planned expense, because all scrap is an inefficiency, and is therefore charged to overheads. Such charges

are recorded upon a labour ticket which is duly authorised. This labour ticket charges the department responsible for the whole labour cost of replacement, and if the scrap should be the operator's fault, then he is charged with any bonus that he earned in making the scrap casting. By the means outlined, the quantity and quality of labour to be used in producing any given job are controlled.

	ALLOYS	DATE
PHOS. BRONZE CHILLS	C.W.B. II & A.O.M.	
	" V	
	" VII	
	" VIII	
	" W.D.	
	VULCAN	
	B.B.S.	
	B.S.S. 421	
	HOLMAN MIX	
	I.C.I. MIX	
G.M. CHILLS	A.G.M. B.B.S. B.S.S. 382	
	G.M. B.S.S. 997/8	
	" " 900/1	
PHOSPHOR BRONZE CASTINGS	C.W.B. II & A.O.M.	
	" V	
	" VII	
	" VIII	
	" XI	
	" W.D.	
	IBIS. XI	
	" M	
	" J	
	COLD ROLL A	
	" " B	
	" " C	
	B.B.S.	
	B.S.S. 421	
	DURO	
G.M. CASTINGS	A.G.M. B.B.S. B.S.S. 382/3	
	" B.B.S. L	
	B.S.S. 997/8	
	B.S.S. 900/1	
	HYDRAULIC	
	R.C.H. G.M.	
	SOLID MIX	
LEAD (phosphor)	80/10/10 & S.A.E. 64	
	PLASTIC	
MANG. & BRASS	MANG. B.S.S. 207/8 26 T	
	" " 32 T	
	" " 34 T	
	" " 38 T	
	" " 45 T	
	BRASS 70 30%	
	" 60 40%	
ALUM. BR.	MILLARD METAL	
	AL. NI. BRONZE	
COPPER		
TIN		
LEAD		
ZINC		
PHOS. CU.		
ALUMINIUM		
CU. NI. (60/20)		
FERRO MANG. (60/20)		
SWEDISH IRON		

METAL PRICE RECORD

FIG. 14.

Control of Materials

The pre-printed tickets which are issued has amongst them a pattern tally card (Fig. 11), which card is again a copy of the routing in all its relevant detail. This card is attached to the pattern at the time of issue to the foundry. It is known, because they are booked, how many moulds of each different kind are ready for pouring at any given time. Therefore, by simple calculation the foundry foreman is able to requisition from the stores the amount of metal required to produce the castings. Over-requisitioning of material will result in excessive melts, and the returning of large quantities of sowed ingots to stores. Thus, by making it possible to ascertain within reasonable limits the amount of metal required to produce the given set of castings, all the factors which are necessary to control the amount melted are present. It follows that an efficient system of Stores Control should be in operation if efficient control of materials is to be maintained. For Stores Control, all metal is requisitioned from stores, and all the returns to stores are also accounted for by means of transfer notes (see Figs. 12 and 13). Every metal movement is weighed and recorded, and from the recording there can obviously be built up a series of metal loss accounts, which are the efficiency control figures for the economical use of materials.

How to Obtain the Information

It is necessary to return momentarily to consider the information contained on the Foundry Cost Estimate Card (Fig. 1), the importance of which can-

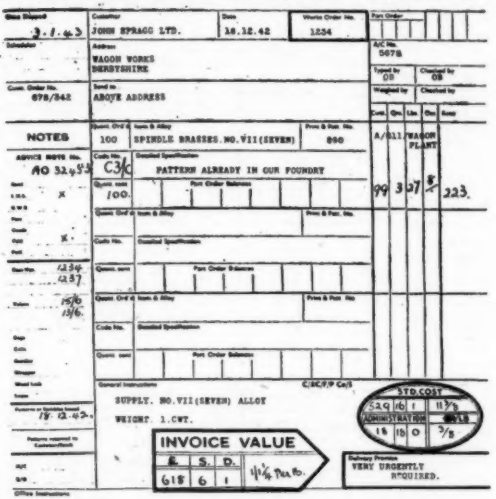

FIG. 15.

not be overstressed. It is indeed one of the fundamental documents in the Phosphor Bronze standard cost system. Very careful attention must be paid to the arrangement of the various documents used in this standard cost system, as they play a very important part, and designed correctly will enable by simple methods the compilation of the costs, which are so essential to the successful operation of any industry.

The Foundry Cost Estimate Card has recorded upon it all the factors necessary to obtain the standard cost. They are the Alloy, Departmental Routing (indicated by the Class and Group), the Yield, and the times allowed for operation. These factors in themselves decide the cost of the casting. As yet, no mention has been made of either metal values or of overhead costs, and they do not appear on the Foundry Cost Estimate Card. How, then, does the statement made—that the performance standards on the Yellow Card (Fig. 1) decide the cost—become true?

Standard Costing and Cost Control

Metal Value

The daily metal price record is set out in Fig. 14. Each alloy which is in frequent use is listed thereon. Their specification and method of manufacture have been definitely established. Therefore, it is possible to ascertain their value since the market price upon any given day, of the metals which go to make up the mixture, is known; also is available the specification and the detailed method of manufacture recorded; it is known when it is necessary to add to the metal value additional charges for ingotting, etc. Further, certain alloys may be second grade alloys manufactured from scrap or residue material, and the daily price record can be adjusted to accord with such facts. The Author's company records the price per lb. of this daily record in the form of a decimal of a pound sterling per lb. weight. Thus, having specified the alloy to be used, the system has indeed specified its cost, because by the routing it is ensured that the alloy called for is the alloy which is used in manufacture.

The Yield

The Foundry Cost Estimate Card contains a piece of information which is the yield percentage. This yield percentage will enable the management to define the amount of metal which should be melted to make the casting. This is influenced by the metal loss which will be made in using any particular alloy. If, therefore, the table of standard losses is built up, classified according to alloys and processes, then the alloy stated on the Foundry Estimate Card again controls the use of the yield figure (see Table I). In building up this standard loss table one will either be guided by the statistics which are available, or the fruits of many experiments made can be used,

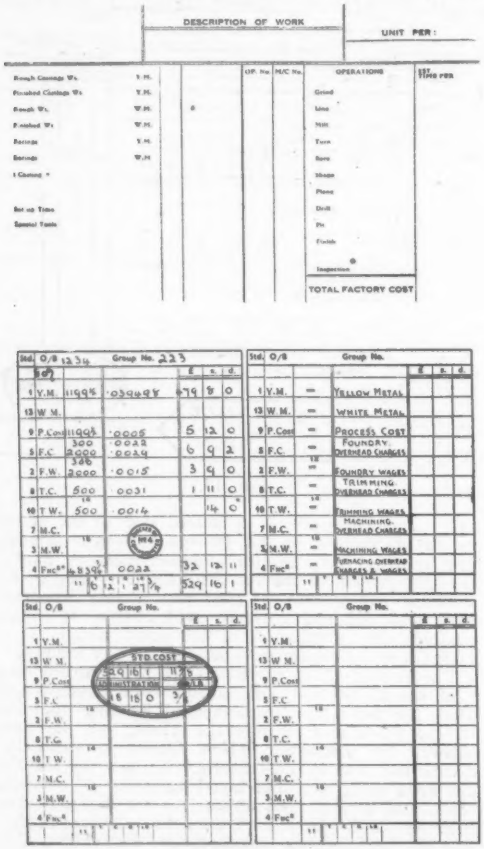

FIG. 16.

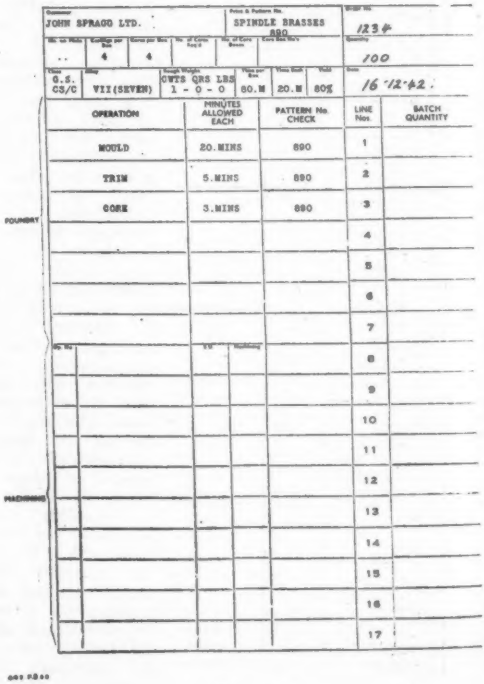

FIG. 17.

together with the great mass of technical data which is in existence. The metal loss is not only a melting loss, but all the other associated losses, such as those which occur during casting, such as splashings, and in trimming. It is inevitable some metal must be lost, and the American Foundrymen consider for standard cost control purposes, that the figure of 5 per cent. is a good standard for any non-ferrous metal, and indeed many alloys show a much higher figure than this.

In returning heads, runners and risers to store, ready for re-issue and re-melt, it is necessary to reduce their value by some agreed figure, because the weight returned to store must inevitably include amounts of adhering sand and other slight contaminations of foreign matter which reduces the value somewhat. This, too, is a metal loss, but in terms of sterling value. In terms of quantity there is, of course, no

TABLE I.—*Standard Metal Loss Table.*

INGOTS.		
Brass, Mang. and Lead Bronzes ...	5	per cent.
Phosphor Bronze and others	3	,, ,,
STICK BRONZE	5	,, ,,
CASTINGS.		
Phosphor Bronze (Test)	8	,, ,,
Phosphor Bronze (Non-test)	6	,, ,,
A.G.M.	8	,, ,,
O.G.M.	5	,, ,,
No. XI	6	,, ,,
Mang. and Lead Bronzes	8	,, ,,
WHITE METAL.		
Zinc Alloys	5	,, ,,
Other	2	,, ,,

loss. These two losses—metal loss in quantity, and the sterling loss in value, can be, together with the yield, turned into a table (Table II) of percentages, for use in connection with the metal at market value.

The labour cost is relatively simple since the routing specifies the time per operation, and the symbolising figures decide the work points. These can be related to the various rates of wages operating in the plant, so that calculation of the amount of wages contained in any given casting becomes a fairly simple matter.

Overheads

A standard overhead must be fixed, but before giving attention to the fixing of the standard overhead, consideration must be accorded to the division which should take place between the departments. Certain of the overhead charges should be distributed on the productive time allowed, and certain of them should be distributed upon the weight melted or handled. This point is very important, and therefore careful consideration must be given to the departmentalising of the organisation from an overhead point of view.

The furnacing charges should be kept very distinctly separate from the departments for which they melt metal; similarly drying charges and stores, and handling charges. The overheads on these departments must be distributed upon a weight factor, while moulding, core-making, and trimming must be distributed upon the time allowed. Having decided upon the basis of the overhead spread, one now must attend to the important business of obtaining the standard overhead. There are two methods which can be used. The first is historical and the second synthetic.

Historical Method

The historical method can only be used where the existing records of overhead expenditure are sufficiently

TABLE II.—*Rough Castings Metal Loss Table, giving Rate Per Cent. of Increase on Market Value of Metal Despatched to Cover Metal Loss at 5 Per Cent., 6 Per Cent. and 8 Per Cent., and Depreciation of Scrap Metal Returned to Store, where Despatched Weight and Yield Rate are known.*

5%

Yield	0	1	2	3	4	5	6	7	9	10
0									116.875	103.333
10	93.500	83.636	76.250	70.000	64.643	60.000	55.937	52.353	49.166	46.316
20	43.930	41.429	39.318	37.391	35.625	34.000	32.500	31.111	29.821	28.621
30	27.500	26.453	25.469	24.545	23.676	22.857	22.083	21.351	20.658	20.000
40	19.375	18.781	18.214	17.674	17.159	16.667	16.196	15.745	15.313	14.898
50	14.500	14.118	13.750	13.396	13.056	12.727	12.411	12.105	11.810	11.525
60	11.250	11.475	10.726	10.476	10.234	10.000	9.773	9.552	9.338	9.130
70	8.929	8.732	8.541	8.356	8.176	8.000	7.829	7.662	7.500	7.342
80	7.188	7.037	6.890	6.745	6.607	6.470	6.337	6.207	6.079	5.955
90	5.833									

6%

Yield	0	1	2	3	4	5	6	7	8	9
0									128.500	113.888
10	102.000	92.273	86.750	77.308	71.429	66.333	61.875	57.941	54.444	51.316
20	48.500	48.952	43.636	41.522	39.583	37.800	36.154	34.630	33.214	31.897
30	30.666	29.516	28.438	27.424	26.471	25.571	24.722	23.919	23.158	22.436
40	21.750	21.098	20.476	19.884	19.318	18.778	18.261	17.766	17.292	16.837
50	16.400	15.980	15.577	15.189	14.815	14.455	14.107	13.772	13.448	13.136
60	12.833	12.541	12.258	13.571	11.719	11.462	11.212	10.970	10.735	10.507
70	10.286	10.070	9.861	9.658	9.459	9.267	9.079	8.896	8.718	8.544
80	8.375	8.210	8.049	7.892	7.738	7.588	7.442	7.299	7.159	7.023
90	6.889									

8%

Yield	0	1	2	3	4	5	6	7	8	9
0									152.500	135.000
10	121.000	109.545	100.000	91.923	85.000	79.000	73.750	69.118	65.000	61.316
20	58.000	55.000	52.273	49.783	47.500	45.400	43.462	41.667	40.000	38.448
30	37.000	35.645	34.375	33.182	32.059	31.000	30.000	29.054	28.158	27.308
40	26.500	25.731	25.000	24.302	23.636	23.000	22.391	21.809	21.250	20.714
50	20.200	19.706	19.231	18.774	18.333	17.909	17.500	17.105	16.724	16.356
60	16.000	15.656	15.323	15.000	14.688	14.385	14.091	13.806	13.529	13.261
70	13.000	12.746	12.500	12.260	12.027	11.800	11.579	11.364	11.154	10.949
80	10.750	10.556	10.366	10.181	10.000	9.824	9.651	9.483	9.318	9.157
90	9.000									

detailed to break up into the various departments which constitute the organisation. It is necessary to trace down the expenditure over a given period, and that any one period is not sufficient since one must have comparison between period and period to enable one to deduct and to remove from such analyses any inefficiencies or apparent super efficiencies. This being done, it is next necessary to divide the amount so obtained by—not the amount of allowed time produced or weight dealt with in that period—but by a normal allowed time or weight. In fixing the normal one will be guided by reasonable expectations for the department. Having obtained the normal time allowed or weight factor as the case may be for the period under review, and having obtained the expenditure

(*Continued on page* 336.)

WOOD DOWELS

By "CHECKER"

Considerable use of wood dowels is made in most pattern shops, especially for dowelling together the halves of patterns and coreboxes from which only a small number of castings is desired. For the better quality patterns and coreboxes required on production work, the metal type dowels are used, but where it is practical the wood dowels will be cheaper and are fixed in position quicker. The sizes of wood dowels generally used are ¼, ⅜ and ½ in. diameters, but can be obtained or made in larger diameters if required, and are usually in lengths of approximately 3 ft.

Dowelling half patterns and coreboxes together presents no difficulty when it is possible to drill the holes for the dowels right through one half into the other, then the two halves can be secured together while this operation is in progress, and correct matching will be assured. If, however, the dowel holes have to be drilled from the joint on both halves and not right through, some method must be adopted which will guarantee the correct position being obtained with the drilling in both halves.

FIG. 1.

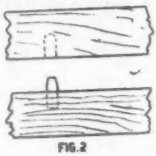

FIG. 2

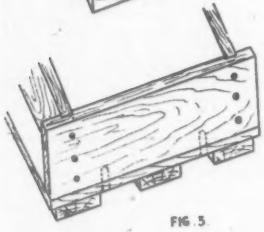

FIG. 3

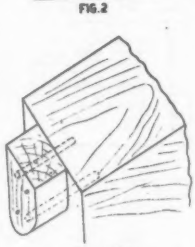

FIG. 4

The following method is recommended, it is simple and efficient:—Place on one half pattern small gimp or panel pins, putting the heads where the centre of the dowels are required. Lay the other half in position on the top, and tap it sharply. The impressions of the pin heads will then be shown on both halves (see Fig. 1). These are the centres for drilling the dowel holes. After drilling the dowels can be cut to length and tapered at the ends to give a lead into the holes in the other half, as shown in Fig. 2. Then they should be given a dab of glue and knocked into position in one half pattern.

Wood dowelling has other uses, one of which is to help secure corebox frames when the continual rapping may loosen the screws holding the bottom to the sides

(*Continued at foot of next column.*)

PUBLICATIONS RECEIVED

Blind Workers in Industry, by K. G. Fenelon, M.A., Ph.D. Published by the Author, from 41, Arden Road, London, N.3.

This 16-page pamphlet is of considerable importance, owing to the statutory obligation placed upon industry to employ disabled soldiers, and this, it can be presumed, will include the blind. Dr. Fenelon has given a quite impartial report, realising as he does that not all blind people possess temperaments suiting them to understand conditions. His study embraces 215 blind persons in industry, distributed over 50 firms. One, a foundry, employs six out-workers sorting sprigs, nails and small scrap, the other 49 employ their blind workers in the actual factories.

The only other foundry job mentioned is that of fettling, but after a perusal of this booklet other possibilities will be shown, as a great variety of work is shown to be capable of being undertaken by the blind. Where this pamphlet is so useful is that it indicates some of the steps necessary to make the blind efficient workers, and the snags likely to be encountered.

Leeds Association of Engineers, 78th Annual Report and Journal. (Hon. Secretary, Mr. J. Sanderson, 17, Well House Drive, Leeds, 8.)

There is something unique about this particular publication. The Association is old—it was founded in 1865 and maintains its traditions. It contains a message from the President (Mr. John Horn) to the members; an account of the annual general meeting; the Presidential address on the preparation of barley and the brewing of beer; the induction of the new Vicar of Leeds (the Association's chaplain) and the sermon given on Rogation Sunday; and a fascinating lecture on his adventures by Lieut. Charles Lamb, D.S.O., D.S.C., R.N. The "Journal" includes in its closing pages some personal notes, a list of members, and the balance sheet.

The output of castings from American malleable-iron foundries has risen from 768,496 short tons in 1942 to 849,764 in 1943. Moreover, the unfulfilled orders were at a higher level at the end of last year than in the previous year.

(*Continued from previous column.*)

and ends, causing the bottom to be moved out of position and taking with it any parts or shapes that may be attached. To counteract this possibility holes should be drilled through the bottom into the sides or ends, for dowels to be driven through, as shown in Fig. 3. This will give added strength to the corebox and stop any movement from rapping. Another example of the use of wood dowelling is shown in Fig. 4, where it is used to prevent a print from being knocked out of position. The holes for dowelling should be slightly smaller than the dowel, so that they can be driven in, but without any danger of splitting the wood.

PROBLEMS OF EDUCATION

Frank discussion by I.B.F. Members at Birmingham

Following the presentation of the Paper entitled "Industry and Education,"* by Mr. G. L. Harbach and Mr. J. R. Horton, together with some supplementary remarks by the joint authors, there was a stimulating discussion on many aspects of the subject by members of the Birmingham, Coventry and West Midlands Branch of the Institute of British Foundrymen, at a meeting held on March 25 at the James Watt Memorial Institute, Birmingham. Mr. J. J. Sheehan, Branch-President, was in the chair.

A vote of thanks to the authors was accorded, on the proposition of Mr. G. W. Brown, seconded by Mr. E. Hunter.

The Foundry Labourer

MR. HUNTER expressed satisfaction that Mr. Horton had stressed the necessity for reforming foundries, and in particular that he had pleaded for some system which would enable workpeople to go home cleaner. Mr. Hunter spoke of the difficulty of the period of adolescence, and said that his experience was that if young people came to work at the age of 16 or 17 they adapted themselves, even to dirty jobs, better than if they started at 14. The fact that they had had a secondary education did not affect their attitude. He had had young people at his works of matriculation standard who made less bones about doing dirty jobs than boys of 14. He had not heard any reference to parental responsibility, and while he felt that industry must do much, he considered that the parents must take their share of the burden. While they were all talking about making moulders and executives and technicians, what about the foundry labourer? All connected with the foundry realised that if they were to have skilled moulders, they must have people willing to do the unskilled work.

Supply of Teachers

MR. A. DUNLOP thought it was necessary to make the preliminary enquiry: What are the conditions likely to be confronting the foundry industry after the war? It was obvious that there would be keen competition from all quarters. Countries which we used to supply with castings had learnt, during the war years, to make them at home, and there would also be the competition arising from the use of plastics and other developments. How was the competition to be met? It could only be countered by the ability of the foundry trade to produce better castings, and that ability was closely associated with improved education. They must also produce schemes for attracting a better type of young person to the foundry. Mr. Dunlop mentioned that he recently heard Dr. Anderson, head of the Birmingham Central Technical College, speaking on technical education. Dr. Anderson, he said, was of opinion that in the past apprenticeship schemes were spread over far too many years. He also suggested that many apprenticeship schemes were used as a means of getting cheap labour. Dr. Anderson thought that properly drawn up courses of instruction should be worked to in industry and in the foundry, and gave it as his view that a course of two-and-a-half to three years was ample. He was opposed to combining working during the day with study at night, and, finally, he made a suggestion, with which Mr. Dunlop identified himself, namely, that after two-and-a-half or three years in the foundry, apprentices should attend a full-time course at a suitable technical college. Mr. Dunlop added that another aspect of the problem concerned the supply of teachers. In order to produce satisfactory foundrymen the teachers must have the necessary experience. He thought the industry could do much in the direction of supplying the personnel for new types of technical college.

MR. HARBACH, referring to Mr. Dunlop's reference to post-war conditions and competition, said he had no doubt that most foundrymen were turning over in their minds how they could reorganise the foundries so that they would be in a position to meet the new competitive conditions. As he saw it, they would have to meet post-war competition by improved quality, and probably by increasing output from the same number of employees.

MR. T. H. JAMESON recalled that some time ago he read an account of schemes for technical training for industry in France. Their procedure seemed to be to put the youngsters through one sieve after another and to classify them, leaving the rejects, he presumed, to be the "barrow wheelers." He hoped that those who were giving this matter such careful attention would try to improve on the French methods, which seemed so rigid. There should be something more humane than that.

White-tiled Foundries

MR. N. C. BLYTHE argued that the Government White Paper, and the business of technical education for industry, were not necessarily identical. The White Paper aimed at better education as a means of adding to the turn of human happiness. That did not of necessity mean that a man had got to know all about his job. As working hours were reduced—and they would get shorter—there would be a greater need than ever for education for education's sake, because without education people could not use their leisure properly. The other side of the question was education for industry, which was also important. That aspect would interest the person anxious to get on in industry, but the foundry labourer was still going to be a perfectly good foundry labourer—in fact, he thought he would be a better—because he was interested in something else. If the foundry industry to-day was not attracting the right, and the best, type of employee, he believed the fault was to a great ex-

* I.B.F. Conference Paper.

tent that of the industry itself. Conditions were admittedly bad in the foundry industry. Buildings would have to be better. They would have to be heated. The people employed would have to be cleaner, and they could be cleaner. He was still hopeful of seeing a foundry with white-tiled walls, and with water running down them to keep them clean. At the foundry with which he was connected, before the war, they introduced shower baths and provided the clothes in which the men worked. On the whole, the experiment was successful. The baths were extensively used, except by the older men.

MR. HORTON, commenting on Mr. Blythe's reference to the older men, called attention to the practice adopted in America and the rotation of jobs, which served to maintain interest. Results, he said, had been obtained from the system. The only criticism came from the older workers, who were innately conservative.

MR. A. J. SHORE expressed his agreement with Mr. Blythe's emphasis on the value of education for its own sake. In his view, it was quite possible to do a rotten job and at the same time enjoy oneself. That was the sort of philosophy they wanted to get over to the workpeople, in order to make them work hard and like it. (Laughter.)

MR. H. G. HALL suggested that a sense of responsibility to the community and industry should be fostered by the I.B.F., and in this connection urged the revival of the Junior Section.

MR. DUNLOP urged that a young fellow entering the foundry or kindred trades should be allowed the same opportunities for study as young people entering the professions.

Parental Responsibility

MR. J. W. GARDOM said his particular interest was to know how they and the foundry industry were going to educate themselves so as to obtain more production at a cheaper rate to pay for all the wonderful things for other people. On the matter of parental responsibility, he ventured the opinion that parents were gradually but surely getting worse. (Laughter.) Nevertheless, in no other industry than the foundry would they find so many sons following their fathers. Mr. Gardom contended that the Ministry made a big mistake in taking the labourers and leaving the tradesmen. The fact that labourers were taken had seriously upset production. He would like to know what action could be taken to entitle the foundry to have the pick of the men they wanted, and not those that the Labour Exchanges wanted to send to them.

MR. HARBACH said he was a metallurgist and had nothing to do with labour. He could only quote the experience on the textile side of industry, that if the conditions were good, money was not the important point that it was generally considered to be. Provide the conditions, and one could take one's pick.

MR. W. L. PROCTOR put forward the view that if education instilled into people the idea of good citizenship and the profitable use of leisure, it might be relied

(*Continued at foot of next column.*)

BOOK REVIEW

Roll Neck Bearings, Part I, Design, Construction and Operation. By L. R. Underwood, D.Sc.(Eng.). Published (for private circulation) by the Iron and Steel Industrial Research Council, Steel House, Tothill Street, London, S.W.1.

This 220-page, well-illustrated book is a report to the Rolling Mill Research Sub-Committee and the Rolling Mill Committee of the Iron and Steel Industrial Research Council. The first thing which impresses the reader is the number of types of bearings used, ranging as they do from phosphor bronze, through white metals, alloyed bronzes, synthetic resins, plywood impregnated with Bakelite, fluid films, roller and needle bearings to wood. It is a natural step to go from this diversity of type to the economic and technical considerations governing their choice. After reducing these to six main headings, a detailed survey is of a conversion and a selection for a new mill. In the next section an endeavour is made to state the problem by the publication of much data on the design features of a large number of typical British plants, which brings the study to the actual radial loads on the bearings.

After stating the fundamentals of the lubrication of roll neck bearings, attention is directed to the means of effecting this, stressing such features as fluid film and boundary lubrication and relating them to design.

Section 5 is probably of the greatest interest to our readers, as it contains a study of the actual operating requirements of a bearing metal, and introduces such factors as causes of failure. Macro- and micrographs are given to reinforce the argument of the text.

Hand and forced feed lubrication returns the subject once more to the engineering side, but the interest of the foundryman will again be commanded in Section 7, wherein the actual fabrication of roll necks, using synthetic resin as a lining. So the subject is pursued until finally, after dealing with Russian developments, the book closes with a long chapter on roller bearings. The roll founders of Great Britain should study this book with meticulous care, as the developments disclosed may have repercussions on their end of the business. V. C. F.

The latest metallurgical institute to be formed in America is the Magnesium Association. The first president is Mr. E. S. Christiansen, of the Apex Smelting Company, of Chicago.

(*Continued from previous column.*)

upon to produce men who would look after their own vocational advancement.

Closing the discussion, the CHAIRMAN thought the general issue of it was that education for citizenship and for life, and vocational training, were complementary, and that all were essential. They were all agreed as to the necessity for thought and action leading to the adoption of a better educational system.

LANCASHIRE BRANCH ANNUAL MEETING

ENCOURAGING SUPPORT OF MEMBERS

The annual general meeting of the Lancashire Branch of the Institute of British Foundrymen was held at the Engineers' Club, Manchester, on Saturday, April 1, Mr. E. J. L. Howard, the Branch President, being in the chair. There was a large attendance of members.

The hon. secretary (Mr. H. Buckley) having read the minutes of the previous annual meeting, Mr. W. N. Cook, B.Sc. (Stockport), in proposing the adoption of the annual statement, said that the financial position of the Branch was extremely satisfactory, the annual income of the Branch being £20 greater than for 1942.

Mr. R. C. Hargraves (Stockport) seconded the adoption of the statement, which was unanimously approved and adopted.

The hon. secretary read the annual report, which in part stated: This report covers a period during which Branch activities have been maintained at a fairly satisfactory level in spite of continued restrictions on travel and transport. The Lancashire Branch covers a wide area, and the transport problem, if solved, would certainly have a marked effect on the attendance at our meetings.

The attendance at the eight meetings held since the last annual meeting has averaged 60 members. This is very encouraging to your Council and President, for attendance is the hallmark which has stamped the Lancashire Branch as a live, virile and potent limb of the Institute for a number of years. The Papers given during the session have again covered many sections of the industry, and the healthy discussions experienced have been proof of the interest aroused.

The last report stated that if the rate of increase in membership could be maintained, the Lancashire Branch should reach the 400 membership mark by the next annual meeting. It is pleasing to report that that figure has been passed.

Since the last meeting, one subscribing firm, 11 members, 29 associate members, and one associate have been added to our membership, and there has been one transfer from associate to member. This is very good, and there is every reason why the rate of increase should be maintained. The results of the last two years have been good, but the Branch could still do better.

Dealing with the statement of accounts, it will be seen that the 1942 figures have been included for comparison, and taking item by item this year's expenditure shows a slight decrease as against the previous year, but it should be pointed out that while certain economies can be effected, there are extra commitments entailed by increased membership. The item of lecturers' expenses is exactly zero, which reflects much devoted work by the president, for his efforts have brought to Lancashire during the past two years some of the foremost men in the industry, and this speaks highly of Mr. Howard's general popularity.

Burnley Section

The Burnley section has had another successful year, holding five meetings, with an average attendance of 25 members. This is an improvement, and is reflected by the increase in membership by three members and six associate members. The foundry classes also restarted last September, and the position of the section generally is indicative of steady progress.

The creation of a library has been an initial success, and should continue to fill a very important section of our Branch facilities. The social evening was very successful, and the Social Sub-committee must feel that their efforts have been well worth while when such support is forthcoming from the members.

In conclusion, the secretary again expressed his thanks to the Branch Council for their support and co-operation, and to all members who had helped him during the past year. To the president he was especially indebted for his help and comradeship.

Mr. John Jackson (Accrington) proposed that the annual report be adopted. Mr. Buckley was an extremely competent hon. secretary, and the Branch were to be congratulated upon having someone who could so efficiently fulfil its requirements.

Mr. J. Haynes (Ashton-under-Lyne), in seconding, said it was extremely gratifying to receive such an excellent report. It was to be hoped that still further propaganda would be instituted in order to increase the membership and to raise the status of the Branch to an even greater level in the future. The annual report was then formally adopted.

Vote of Thanks

Mr. E. Longden (Manchester) proposed that a hearty vote of thanks be accorded to the retiring officers of the Branch for their services during the past year. In the first place he wished to pay tribute to the excellent services rendered by Mr. E. J. L. Howard as the President not merely of the Branch, but also for the manner in which he had represented its interests in regard to other sections of the foundry industry, and for the encouragement he had given to everyone connected with the organisation in a time when the difficulties encountered were continually increasing. His services during the past two years had been most particularly commendable, and they had been rendered in addition to many other responsibilities he had assumed, including participation in Home Guard duty.

Mr. A. Hopwood (the President-Elect) seconded the vote of thanks, which was carried unanimously by acclamation. He heartily associated himself with the tribute which Mr. Longden had paid to the President for his services during past two years.

The President (Mr. E. J. L. Howard), in responding to the vote of thanks, very much appreciated the kind remarks which had been made to all the retiring officers. Personally, he had received very much assistance from the Council and the members generally in carrying out of his presidential duties, and perhaps above all the hon. secretary. During his term of office he had had the inestimable pleasure of making many new friends, and he felt he must acknowledge the great assistance the Branch had received on the

part of the Entertainments Committee in making the social evening on March 11 the outstanding success it proved to be. He had thoroughly enjoyed his two years of office.

Election of President

Mr. E. J. L. Howard (the retiring President) then proposed the election of Mr. A. Hopwood (Liverpool) as President of the Branch for the forthcoming year. Mr. Hopwood, he said, was an old member of the Branch, and had served upon its Council for a number of years. He had also presented Papers before several of the Branches of the I.B.F., and held the Diploma of the Institute.

The motion was carried by acclamation.

Mr. A. Hopwood, the newly-elected President, then took the chair.

The President (Mr. A. Hopwood) said it was a very proud moment in his life to find that he had become the President of the Branch. He thanked the retiring President (Mr. E. J. L. Howard) for his extremely kind remarks concerning himself, and also the officers of the Branch and the members generally for the promise of their full support during his term of office. He would do his utmost to maintain the high traditions of the presidential office, and hoped he would be able to fulfil all the responsibilities with which he would most certainly expected to cope.

Election of Officers

After Mr. S. Brooks (Bramhall) had been unanimously elected the senior vice-president, the President said that the unopposed officers of the Branch who would be automatically re-elected to office were Mr. A. Phillips (Manchester) and Mr. J. Jackson (Accrington) as members of the Technical Committee; Mr. H. Buckley as hon. secretary; Mr. F. A. Harper as assistant hon. secretary, and Mr. R. R. Hargraves and Mr. G. C. Studley as auditors.

Upon the motion of Mr. R. S. Yeomans (Salford), seconded by Mr. R. C. Hargraves (Stockport), these members were formally re-elected to office for the current year.

Mr. W. Brown (Bramhall) was unanimously elected junior vice-president, and on a ballot the following were declared elected:—As members of the Branch Council for 3 years, Mr. F. C. Demains, Mr. R. R. Hargraves, and Mr. R. S. Turner. As representatives on General Council for one year, Mr. W. N. Cook, Mr. J. Jackson, Mr. W. Holland, and Mr. E. J. L. Howard.

Presentation of Diploma

The President (Mr. A. Hopwood) then formally presented the Diploma of the Institute to Mr. J. Hill (Heywood), joint author with Mr. J. W. Bolton of the Paper entitled: "Continuous Production of Manganese Steel Castings from the Convertor." The Paper was read at the annual general meeting of the Institute, and was published in THE FOUNDRY TRADE JOURNAL.

Mr. J. Hill suitably responded to the presentation.

There being no further formal business, the President asked Mr. D. F. Fleming to read his Paper on "The Laboratory and the Foundry."

STANDARD COSTING AND COST CONTROL

(*Continued from page* 331.)

suitably adjusted as explained to take out any inefficiencies or apparent super efficiencies, now one can obtain the standard overhead per hr. where the basis of spread demands it, or standard overhead per lb. weight.

Synthetic Method

The synthetic method of building up a standard overhead figure is one which many writers on the subject consider to be the best. Obviously, careful examination of the departmental layout will make possible the synthetic building up of the expected cost of the operating department. If this expected cost or budget is divided by the output upon which the budget is fixed, and that output figure would be the normal output expressed either in terms of time or weight, according to the basis, it will be found to give the standard overhead for such department. This method has the advantage that it automatically excludes any inefficiencies. This point is extremely important, for it is upon this fact that other systems of costing have so lamentably failed.

The Foundry Cost Estimate Card data decided the cost of the job, and yet they did not contain the overhead figures. Again the routing will be designated by the class and the group, and is the key to the standard overhead figures to be used.

The standard overhead figures will be departmentalised on the same lines as the productive organisation, bearing in mind the necessity for carefully avoiding conflict in the basis of overhead spread, and therefore the routing given in Fig. 1 designates the overheads as well as the labour costs. The earlier statement remains true, that the data fixed on the Foundry Cost Estimate Card fix the cost of the job.

Before turning to see the assembly of this information in its finished form, one must consider the documents used. Earlier reference was made to the Labour Routing Tickets (Fig. 15). This document, which is a copy of the customer's order set out on the form which is used to record the quantity of the articles sent away, its weight, and the date upon which it was shipped, in addition to the Order Number which is given to that particular job. This document has also many other copies taken off it at the time of its pre-printed issue, but only two copies are used at the time of despatch. One called the "pink" ticket, and the other (Fig. 16), the "Accounting Copy," which on its side has panels for calculation. Fig. 17 shows a copy of the routing, which has all the essential information recorded on it, and also the order number, and the quantity called for on the customer's current order.

Attention is drawn to those three documents because their arrangement is very important to the next stage, is the final compilation of the cost, and the many uses to which the figures so obtained can be put.

(*To be continued.*)

WEST OF ENGLAND IRONFOUNDERS' ASSOCIATION

FIRST ANNUAL GENERAL MEETING

The first annual general meeting of the Association was held recently in Bristol. The chairman (Mr. N. P. Newman) reported that the membership was 62 firms, which could be considered very gratifying in the light of the Association's brief existence. He made mention that a short time ago the industry was faced with the possibility of concentration, and it had actually been applied in one district, but the matter had been abandoned at a later stage after the Council of Ironfoundry Associations had formed area committees in different sections of the country, and as a result of investigations by those area committees the national body had been able to satisfy the Board of Trade that the products of the industry were essential to the war effort, and that concentration within the industry would be detrimental to the war effort. He informed the members of the Association's affiliation with the National Ironfounding Employers' Federation, and through that body with the Council of Ironfoundry Associations.

Fuel Committee.—Reference was made to the formation of a National Committee which had elected some thirteen panels in the country, and that these panels had been found most helpful in spite of the fact that the industry had made endeavours to economise in fuel consumption. Visits to foundries by the experts of these panels had proved very helpful.

Technical Committee.—Reference was made during the course of the speech to research and to technical committees, and these had formed an important link in the national set up of the industry with benefit to members, and the chairman felt sure that, if members referred their problems to the secretary, through the national contacts, they would be supplied with helpful information. He was also sure that the developments through these committees would be of great service to the industry in the future.

Education Committee and Apprenticeship Schemes

The chairman referred to the growing difficulties which foundries were experiencing all over the country in obtaining the right type of youth to become interested in the foundry industry. It was pointed out that, as one of the basic and important industries in the country, a realisation of the importance of the ironfounding trade seemed to be lacking, and that this matter was receiving careful thought by the national body which had appointed an Education Committee, and they were fortunate in having Capt. W. E. Hunt, one of their members, as a representative on the National Committee. The chairman then called upon Capt. Hunt to report upon the position, and Capt. Hunt informed the meeting that the Council of Ironfoundry Associations had set up three committees, to deal with apprenticeship training and higher education, the recruitment of suitable apprentices, and a third to deal with pre-employment training. The Committee were obtaining suitable photographs showing foundry processes and operations, and a book would be issued to parents and boys, and also sent to education committees and teachers, and contacts were also being established with trade unions.

It was also mentioned that the West of England Association, in collaboration with the local education authorities, had introduced, during the winter, classes at the Merchant Venturers' College, and that some firms were not only paying the fees, but travelling expenses, and the Association had decided to award a prize to the best student.

Costing.—The chairman referred to the importance of this subject, and informed the members that the national body had set up a committee which had co-opted representatives from the Institute of Costing and Work Accounts, with the object of trying to establish a set of costing principles which could be recommended to the industry as a whole, and which could be adapted to the various fields of foundry production.

The Iron Federation.—A copy of the draft constitution had been circulated to members informing them of the proposal to set up this joint body comprising producers and users of foundry pig-iron, and the chairman informed the meeting that their Executive Committee had warmly approved of this new body which it was felt would perform many useful functions on behalf of the whole industry, and he made it clear that this new federation would not in any way interfere with the domestic autonomy of the various area and sectional associations. Reference was also made to the financial aspect, and the chairman pointed out that under the proposals individual firms would, in the long run, have less to pay than was originally contemplated under the Council of Ironfoundry Association scheme which had been produced earlier in the year. The meeting unanimously agreed to support the Iron Federation.

Costing of Government Contracts.—The chairman referred to this matter in the light of recent approaches, and strongly recommended that if any firm were approached in regard to the matter they should communicate with the secretary in the first instance.

Post-War Reconstruction

In his recommendations on the subject of post-war reconstruction, the chairman said that whilst they were all agreed that their main energies should be directed to winning the war at the earliest possible moment, he was also certain that some time and thought should also be given to this important subject which he was sure was exercising the minds of all in responsible positions. He said there is ample evidence that much thought is being given to the future as to how the two outstanding and interlocking problems of raising the standard of living everywhere and providing steady employment for all are going to be solved, and the meeting generally agreed that these problems are soluble, and that they must be solved if there were going to be any stable conditions after the war.

Accounts.—The audited accounts for the fourteen months to December 31, 1943, had been circulated to members, and the chairman made reference to adjust-

(*Continued overleaf, col.* 1.)

TURKISH CHROME ORE

An interesting situation appears to have arisen in connection with Turkish chrome ore, it being stated in "Cumhur," an Istanbul newspaper, that the Allies can have their share of Turkish chrome if they follow Germany's example and provide transport. The Germans are said to be taking delivery of ore in German rolling stock which has been lent to Turkey for this purpose. On the other hand, the Allied share of Turkish production is said to be accumulating owing to lack of transport. It is pointed out that the quantities of chrome ore now being sent to Germany were fixed with Britain's knowledge and approval, while inquiries in Istanbul confirm that Turkish monthly deliveries of chrome to Germany have increased threefold since the beginning of this year. It is estimated that from January 1, Germany has taken delivery of about 25,000 tons of ore, yielding 48 per cent. of standard chrome. Total chrome deliveries to Germany for the whole of last year are said to have been 30,000 tons, representing an average monthly delivery of 2,500 tons, compared with over 7,000 tons at present. It may be recalled that in 1941 the Turks signed an agreement with Dr. Clodius to supply Germany with 180,000 tons of chrome spread over 1943 and 1944. Since only 30,000 tons were delivered in 1943, Turkey has to export 150,000 tons this year to make up the total agreed upon. It is evident in this connection that for Germany the time factor is vitally important, because 150,000 tons of chrome ore on rail is not the same as its equivalent already in the form of war material.

WEST OF ENGLAND IRONFOUNDERS' ASSOCIATION

(*Continued from previous page.*)

ments which had been agreed at the Executive Committee meeting in the morning, and subject to these alterations, the accounts were passed.

Re-election of Mr. N. P. Newman as chairman and Mr. C. H. Hitchin as vice-chairman, together with the re-election of the Executive Committee, were unanimously agreed to, and votes of thanks were heartily accorded to the chairman, vice-chairman, the committee and secretary for the good work they had done during the year.

The chairman, in thanking the members for his re-election, stated that there were one or two firms in the area which were not members of this Association, and he asked members during conversations with firms in the area to make enquiries, and if they found any firms were not yet affiliated, to recommend that they should enquire from the secretary regarding membership. He said there would be many problems and difficulties arising in the post-war period where co-operative efforts were bound to redound to the benefit of all concerned.

PRODUCTION AND SALE OF FLUORSPAR

DERBYSHIRE PRODUCERS' ASSOCIATION

The first annual meeting of the Derbyshire Fluorspar Producers' Association was held at Matlock on April 4.

The chairman (Mr. Frederick Franks) recalled that the Association had been formed as the result of the Ministry of Supply's Fluorspar Controller's first annual report, which contained criticisms and suggestions in regard to the industry. Before the war, the industry was in a chaotic and unprofitable condition, and, in view of the vital part fluorspar played in the manufacture of steel and metals, the position had at one time caused serious misgivings. The Association was overcoming many of the difficulties, and there was confidence that in the near future it would be established on a sound and national basis.

The Fluorspar Controller (Mr. W. T. Vizer Harmer) and his staff had been most helpful, and as the result of two deputations to London to meet the Control, grades and prices had been agreed, and steps were being taken to bring them into operation at an early date. Producers outside Derbyshire had shown interest in the Association's work, and meetings were being arranged with a view to getting grades and prices adopted on a national basis. The time for unspecified and unguaranteed fluorspar content would soon be past, and the Association would continue to work, in conjunction with the Control, to establish better and uniform grades and prices. A good deal of development work had taken place during the war, and producers were justified in asking for help and protection to achieve their aims. The Association had opened a section whereby approved merchants could be associated with the producers, and their co-operation continued.

Officers for the ensuing year were elected as follow:—Chairman, Mr. Frederick Franks; deputy chairman, Mr. Charles A. Jones; secretary, Mr. H. Hebblethwaite, 39, Foxwood Avenue, Sheffield, 2; Executive Committee: One member from each of the following firms—Clay Cross Company, Limited; Blanchland Fluorspar Mines, Limited; Constables Quarries, Limited; R. C. Conway; Ernest Hinchliffe, Limited; H. Taylor; James Wilkinson & Sons, Limited (Glebe Mine); and William Smith (Fluorspar), Limited.

Millom & Askam Hematite Iron—Trading profit, etc., for 1943, including £61,091 in respect of claims for 1941 and 1942, subject to adjustment for 1942 and 1943, £203,408 (£125,848); debenture interest and redemption, £11,680 (£11,557); tax, £100,000 (£28,000); war damage contribution, £874 (£1,219); net profit, £87,482 (£81,221); preference dividend, £27,362 (same); ordinary dividend of 10% (7½%), less tax, £29,243 (£21,932); written off fixed assets, £30,000 (£20,000); to general reserve, nil (£10,000); forward, £42,632 (£41,755).

NEWS IN BRIEF

MULTIPLE ACTING - FLUX, LIMITED, announce that their address is now 8, Ravenscroft Avenue, London, N.W.11.

THE ENGINEERING UNIONS' claim for an advance of 10s. a week on basic rates has been rejected by the employers. The claim is being taken to the National Arbitration Tribunal.

TEESSIDE CHAMBER OF COMMERCE has adopted a report by a special committee with reference to the establishment of an Industrial Development Committee for the whole of the Teesside area.

THE BRITISH STANDARDS INSTITUTION announce the issue of revised standards 1021-7, 1944, and 1158-9, 1944, "Copper Alloy Ingots and Castings." It costs 2s. net from the office of the Institution, 28, Victoria Street, London, S.W.1.

THE COMMITTEE of the Maudslay Society has decided to postpone the exhibition of Maudslay relics which was to be held at the Institution of Mechanical Engineers on Saturday, May 6. The second annual general meeting of the Society will be held there on that date, at 11.30 a.m.

A WHITE PAPER obtainable from the Stationery Office (Cmd. 6514, price 2d. net), describes existing Government machinery for the promotion of scientific research and development. It is intended to be a background for the discussion of the part which the Government can play in this field after the war.

A GENERAL MEETING of the Institute of Metals will be held at the Institution of Mechanical Engineers, Storey's Gate, St. James's Park, London, S.W.1, on Wednesday, May 17, at 6 p.m. The annual May Lecture will be given by Sir Harold Spencer Jones, M.A., Sc.D., F.R.S., the Astronomer Royal, on "Metals in the Stars."

A MEETING of the Industrial Radiology Group of the Institute of Physics will be held at the Royal Institution, Albemarle Street, Piccadilly, London, W.1, on Saturday, April 22, at 2.30 p.m., to discuss a Paper entitled "The Mottling of Aluminium Alloy Radiographs," by W. H. Glaisher, B.Sc., W. Betteridge, Ph.D., F.Inst.P., and R. Eborall, B.A.

MR. R. W. COOPER, presiding at the annual meeting of the British Aluminium Company, Limited, said that all the works of the company had operated to full capacity and further extensions became productive during the year. The programme of expansion in the national interest had not yet been completed, and work of considerable magnitude was still proceeding.

A MACHINE OPERATOR, Henry Shuttleworth (41), was at Manchester City Police Court, on Tuesday of last week, fined £5 and also ordered to pay the same amount as damages, for maliciously setting fire to a door at the ironfoundry where he was employed. One of the reasons given by Shuttleworth for his action was that he had been accused of slowing down production, and he had set fire to the door in a fit of temper.

THE "NICKEL BULLETIN" for March, 1944, contains abstracts dealing with modified "heavy metal" alloys, the creep strength of age-hardened copper-base alloy, cavitation-erosion tests on nickel-containing alloys, end-quench hardenability tests on cast test-pieces and the copper-brazing of small steel parts. Copies of the "Nickel Bulletin" may be obtained, free of charge, from the Mond Nickel Company, Limited, Grosvenor House, Park Lane, London, W.1.

DUE TO EXPANSION, the Directorate of Prices and Statistics, Iron and Steel Control, will in future be comprised of three separate departments under the direction of Mr. R. M. Shone, former Director of Prices and Statistics, who will now occupy the post of General Director in charge of Prices, Costs and Statistics, with responsibility for co-ordination. The new departments will be headed by: Mr. C. F. Pagnamenta, who will be Director of Prices; Mr. J. W. Erskine, Director of Costs; and Mr. S. T. Clark, Director of Statistics.

THE BOARD of the Institute of Physics has authorised the formation of a Scottish Branch of the Institute, which is to be centred in Glasgow. The inaugural meeting of the branch will take place at 2.30 p.m. on April 22, in the Chemistry Buildings of the University of Glasgow. Mr. E. R. Davies, F.Inst.P., a vice-president of the Institute and Director of Research, Kodak, Limited, will deliver an illustrated lecture on "High Speed Photography, and its Applications in Science and Industry." Visitors will be welcome; admission is free and without ticket. Further particulars of the Branch may be obtained from the acting hon. secretary, Dr. R. S. Silver, F.Inst.P., c/o G. & J. Weir, Limited, Cathcart, Glasgow, S.4.

IN THE PROCESS of chromium plating small nodules of almost pure chromium are deposited in the vats and on the "suspenders" and "robbers" of the bath. At least one producer of chromium metal is interested in the commercial recovery of these nodules and chromium platers having an accumulation of nodules, or able to offer them in regular parcels, should communicate with the salvaging company, whose address can be obtained from the Ministry of Supply, Chrome Ore, Magnesite and Wolfram Control, Broadway Court, Broadway, Westminster, London, S.W.1. Although individual contributions may be small this recovery scheme should, in the aggregate, provide a welcome addition to the chromium metal availability.

THE INSTITUTION OF MECHANICAL ENGINEERS announce that an informal meeting will be held at Storey's Gate, St. James's Park, London, S.W.1, on Friday, May 12, at 5.30 p.m., when there will be an exhibition of technical films. A general meeting will take place on Friday, May 19, at 5.30 p.m., when a Paper on "Condensing Locomotives" will be given by Professor G. V. Lomonossoff, Dr.-Ing., M.I.Mech.E., and Captain G. Lomonossoff, R.E.M.E. An extra general meeting in conjunction with the Applied Mechanics Group will be held on Friday, June 2, at 5.30 p.m. Captain J. Harris, B.A., will present a Paper on "Coupled Engine Torsional and Propeller Flexural Vibrations," which will be followed by informal discussion on "Methods of Investigation of Engine Vibration."

COMPANY RESULTS

(Figures for previous year in brackets)

G. Hopkins & Sons—Profit for 1943, £34,913 (£19,485); final dividend of 9% and a bonus of 2½%, making 17½% (10%).

Glover & Main—Profit for 1943, £77,214 (£71,155); ordinary dividend of 15% (12½%) and a bonus of 7½% (same); forward, £37,026 (£34,344).

Harris & Sheldon—Net profit for 1943, after making all provisions, including reserves for income-tax and E.P.T., £12,421 (£12,560); dividend of 10% on the ordinary shares; to general reserve, £5,000; forward, £20,205 (£19,424).

Ideal Boilers & Radiators—Net profit for 1943, £136,283 (£298,838); to reserve for taxation and contingencies, £67,003; dividend (gross) on the preference shares, £50,000; ordinary dividend of 2½%, free of tax (15%), £17,500 (£70,000); forward, £214,602 (£212,822).

E. G. Brown—Trading profit, £212,576 (£228,235); net profit, £23,723 (£18,595); to reserve, £2,000 (same); preference dividend of 5½% net, £2,750 (same); 2.4d. (same) per ordinary share, paid in May, 1943, on 1,000,000 shares, £5,000 (same); 2.4d. (3.6d.) per ordinary share, paid in December, 1943, on 2,000,000 shares, £10,000 (£7,500); forward, £16,831 (£12,858).

Birmingham Small Arms—Profit on trading and income from investments, including trading results of the subsidiaries, after providing for E.P.T., N.D.C. and contingencies, £744,219 (£719,758); debenture interest, £56,033 (£57,289); fees, £13,020 (£11,643); net balance, £675,166 (£650,826); income-tax, £400,000 (same); premium on redemption of debentures, £896 (£850); war damage, £95,000 (£135,000); repayment of debentures, £34,960 (£33,750); dividends on 5% "A" preference and 6% "B" preference shares, £15,596 (same); ordinary dividend of 7½%, £105,569; forward, £261,455 (£238,310).

NEW COMPANIES

("Limited" is understood. Figures indicate capital. Names are of directors unless otherwise stated. Information compiled by Jordan & Sons, 116, Chancery Lane, London, W.C.2.)

Cornish Engineering, Popham Street Works, Popham Street, Nottingham—£1,000. W. W. and L. Cornish.

J. H. Ritson & Son, Bankwell Lane, Gateshead—Brass and aluminium founders. £3,000. J. H. and S. Ritson.

Bowman & Beddows, 13-15, Roscoe Street, Liverpool, 1—Engineers, etc. £5,000. G., R. S. and A. Bowman.

MIDDLESBROUGH TOWN COUNCIL has sent a resolution to the Prime Minister protesting against the exclusion of the town from the North-East Special Development area.

PERSONAL

MR. JOHN LATTA has resigned his position as a director of the Scottish Stamping & Engineering Company, Limited, Ayr, to take up an appointment in England.

MR. WILLIAM M. SHANKS, C.A., director of Cruikshank & Company, Limited, Denny Iron Works, Denny, has been appointed a Justice of the Peace for the County of Stirling.

MR. I. A. R. STEDEFORD, managing director of Tube Investments, Limited, has also been appointed chairman, in succession to Mr. J. Herbert Aston, who retains his seat on the board. Mr. G. S. Maginness has been appointed deputy chairman.

MR. M. J. GREGORY, the author of this year's American Exchange Paper to the Institute of British Foundrymen, is factory manager of the Foundry Division of the Caterpillar Tractor Company, Peoria, Illinois. He has been a member of the American Foundrymen's Association for a number of years, having served on various committees, and at present is a member of the board of directors. Mr. Gregory was an apprentice at Brown & Sharpe Manufacturing Company, of Providence, Rhode Island. He studied at Brown University, and the Massachusetts Institute of Technology, where he was a student of metallography under the direction of the late Dr. Albert Saveur. The Paper Mr. Gregory has written, "Wartime Calls on Women to Make Air-Cooled Aluminium Cylinder Heads," describes the aluminium foundry set up by his Company, which is an example of a highly mechanised plant designed to utilise women workers almost exclusively. It describes the technique used in producing air-cooled cylinder heads made in moulds by the core-blowing method.

OBITUARY

MR. ANDREW MORGAN, late of France & Morgan, Limited, brassfounders, died recently at his home at Dumbreck, Glasgow.

MR. FREDERICK SCARF, chairman and managing director of A. Knowles, Limited, iron and steel stockholders, of Willenhall, and of the Bromford Iron Company, Limited, steel re-rollers, of West Bromwich, died recently.

WE REGRET to record the death of Mr. Andrew Harley, a well-known figure in the foundry industry for many years, who died at his home at Coventry last Sunday. He had been ill for some time. Mr. Harley was a Past-President of the Institute of British Foundrymen, a Past-President of the International Committee of Foundry Technical Associations, and a Past-President of the Birmingham Branch of the I.B.F. He was elected a member of the Institute in 1910. He had presented a number of Papers to the Institute from time to time. Mr. Harley had been with the Daimler Company, Limited, for some time past, and before joining that company had been with the Carron Company and Coalbrookdale Company, Limited.

STANTON DALE

Refined PIG IRON

for High Duty

Castings by Morris Motors Limited.

Casting by Baker Perkins Limited

Castings by Ruston Hornsby Limited

Castings by Ruston Hornsby Limited

Casting by David Brown & Sons (Hudd.) Ltd.

Casting by Oxford & Cowley Ironworks Ltd.

THE STANTON IRONWORKS COMPANY LIMITED
NEAR NOTTINGHAM.

Raw Material Markets

IRON AND STEEL

A reduced number of blast furnaces is now operating. The primary object is to reduce railings of ironstone, but of little less importance at the present time is the reduction of fuel consumption that is achieved. Reduction of pig-iron output will not be permitted to jeopardise the supply for essential purposes. There are good stocks available, and these, added to the restricted current and future make, are sufficient to ensure that foundries engaged on vital work get all the iron they need. But obviously there must be economies, and certain classes of pig-iron users have been told to reduce their consumption by 10 per cent. It is the desire of the Control that users should have a uniform working stock at the end of July equal to six weeks' requirements on the reduced basis, and licenses now being granted have that end in view.

Activity among the light-castings foundries shows very little change, and there is an adequate supply of high-phosphorus iron to meet their requirements. There is still an active demand from the engineering foundries for low-phosphorus grades and also for refined iron and steel scrap. Scrap is not plentiful at the moment, short steel scrap being possibly even harder to get than good cast-iron material. The Control will not permit a higher consumption of scrap in those foundries subjected to the cut in pig-iron deliveries. Basic iron production is kept at a high level to meet the requirements of the steel furnaces.

The drop in coke production owing to the shortage of coking coal has affected some foundries rather severely. Transport considerations have also played their part in limiting coke deliveries. Fortunately, there is peace in the coalfields again, and the fuel situation may be expected to improve accordingly. Establishments which acquired reserves of coke have found them very useful; but some foundries cannot carry big stocks of fuel, and any interruption of deliveries is a serious matter.

There are no visible signs of any shrinkage in the demand for re-rolled products. Substantial outputs of light and special sections, small bars, sheets and strip are still required, and these in turn call for undiminished deliveries of blooms, billets, slabs and sheet bars. Hitherto, the steelmakers have been reasonably successful in meeting their obligations to the re-rolling mills, but this month deliveries have been less satisfactory, and although substantial tonnages of defectives, crops, etc., are accepted as they become available, further inroads have had to be made upon reserve stocks of imported billets. Sheet bars are rather more plentiful, and seconds are less easily cleared.

There is still a considerable accumulation of finished steel at the works, which is held up owing to transport difficulties. All this material has been produced in fulfilment of definite orders, and makers would be glad to be rid of it as soon as circumstances permit. But the strain on the railways is likely to increase rather than diminish and, linked with the restriction of fuel supplies, this is exercising a prejudicial effect on production.

The outstanding feature of the steel trade is still the demand for plates and sheets—not only for the shipbuilding trade, but also for a wide variety of essential industries. In the sheet trade, there is a particularly heavy demand for the lighter gauges, while the activity of the mills rolling light sections contrasts with the shrunken demand for heavy sizes. Steady support is provided by the collieries and railways and wire drawers.

NON-FERROUS METALS

Consumption of copper in this country, although still on a substantial scale, has been declining during the past few months, and shows no sign of any increase. Although there is no reason to believe that the stock position is anything but satisfactory, and all essential priority undertakings are being supplied, there have been no general civilian releases of copper or any other of the non-ferrous metals. The effects of the curtailment of Rhodesian production will make themselves felt later; recent reports from Rhodesia have stated that the miners are contemplating strike action owing to dissatisfaction with the decisions of the Conciliation Board. Supplies held in reserve by the Government should meet any emergency, and it is a wise policy of the Control's in not relaxing their restrictions on deliveries to commercial consumers.

The cut in supplies of gas and electricity to industry will almost certainly result in some falling off in the demand for non-ferrous metals. Production of vital munitions is likely to continue as strongly as ever, but many goods are in comfortable supply, and there may be an easing in certain directions. Tin now seems to be available in fairly satisfactory quantities, and all really essential needs are being covered. Supplies are still rigidly controlled, but slight concessions have been made in that the limitations of the tin content in solder are not so strictly enforced as they were at one time.

There is an almost complete absence of any news concerning lead and zinc. Large quantities of both are being utilised in the war effort, and transport difficulties prevent the release of any substantial amounts for civilian requirements.

CATALOGUE RECEIVED

Melting Furnaces. Lees Hall & Sons, Limited, Tamworth Road, Bassetts Pole, Sutton Coldfield, Warwickshire, have just issued a 16-page well illustrated brochure, in which are detailed lines of gas- and oil-fired bale-out furnaces; tipler moulds; central axis tilting crucible furnaces using oil, gas or coke as fuel, and a semi-rotary non-crucible furnace. The performance data relating to capacity are set out on two pages, which is followed by one devoted to gas and oil burners.